Sliding Indirect Inguinal Hernia

MAX R. GASPAR, *M.D.*, Long Beach,
MORTON M. WOOLLEY, *M.D.*, Los Angeles, and
EUGENE J. JOERGENSON, *M.D.*, Glendale

• **From 2 per cent to 5 per cent of all indirect inguinal hernias are of the sliding variety. (Sliding hernias are those in which part of the wall of the sac is formed by a viscus.) The proportion of sliding hernias is even higher in the aged. Hernias of this kind are found almost exclusively in males and usually on the left side.**

Preoperative diagnosis is not essential if the surgeon can recognize the lesion at operation and knows how to repair it properly. The LaRoque technique in which the peritoneal cavity is entered above the internal ring allows accurate definition of the pathological anatomy and effective repair of the hernia. It should be used in all true sliding indirect inguinal hernias.

APPARENTLY sliding indirect inguinal hernia is still an enigma to many physicians including surgeons who repair large numbers of hernias. It is much more common than generally thought. The recurrence rate following operation is high.

The sac of the ordinary indirect inguinal hernia is formed entirely by parietal peritoneum. When part of the wall of the sac is formed by a viscus, the hernia is called a sliding hernia. Often the medial wall of the sac of an indirect inguinal hernia is formed partially by bladder and its overlying peritoneum. This is usually true in direct hernias. Such conditions cause no great additional problems in repair and will not be considered here. However, when the posterior wall of the sac is formed by the bowel and its overlying visceral peritoneum, it is a true sliding indirect inguinal hernia. The repair may be difficult and does require careful consideration. Proper repair is dependent upon proper understanding of the pathological anatomical changes involved.

These hernias arise because of relaxation of tissues associated with advancing age and increasing obesity. An indirect hernial sac, large or small, is probably present in all cases prior to the beginning of the sliding process. On the left side of the body the distal descending colon (iliac colon) is often in close proximity to the internal inguinal ring and frequently has a mesentery continuous with the sigmoid mesentery. At its base the lateral leaf of the mesentery is continuous with the posterior parietal peritoneum which forms the posterior wall of the hernial sac. As the retroperitoneal connective tissues become infiltrated with fat and as the muscles and fasciae become weaker with age the posterior parietal peritoneum advances through the ring. The intramesenteric connective tissues, also infiltrated with fat, allow the peritoneal leaves of the mesentery to separate and unfold. The lateral leaf of the mesentery follows the parietal peritoneum through the ring. The bowel itself encroaches on the ring and slides through it and dilates it. The process is augmented by the increased intraabdominal pressure associated with increased obesity. Eventually a large loop of bowel and even the medial leaf of the mesentery, may slide through the ring and form the posterior wall of the hernial sac.

On the right side of the body a similar process takes place, allowing the cecum to enter the internal ring. In large hernias on the right side the entire cecum, the ascending colon, the appendix, the appendiceal mesentery, the terminal ileum and the mesentery of the terminal ileum may form the posterior wall of the sac.

Sliding indirect inguinal hernia has been considered to be comparatively rare. It has been reported in from 1 to 3 per cent of inguinal hernias.[9] At the Los Angeles County General Hospital, hernia repair is a relatively infrequent operation because of the press of more urgent surgical procedures. In the eight-year period from 1948 to 1955 inclusive, inguinal hernia repair was done in 2,688 cases. This number included 52 indirect sliding inguinal hernias, an incidence of 1.9 per cent of all inguinal hernia repairs. Ryan[6] recently reported 313 cases, which constituted 5.06 per cent of all the inguinal hernia repairs or 6.75 per cent of all the indirect inguinal hernia repairs done in an eight-year period. In persons over 50 years of age the incidence was 10.7 per cent of the indirect inguinal hernias repaired. Sensenig and Nichols[7] reviewed 1,200 cases of inguinal hernia and noted that 4.9 per cent were sliding hernias. In a series of 361 hernia repairs in 305 patients done by one of the present authors (M. R. G.) there were 295 inguinal hernias of which 246 were indirect, 13 of them sliding, an incidence of 3.6 per cent of all the hernias, 4.4 per cent of

Presented before the Section on General Surgery at the 85th Annual Session of the California Medical Association, Los Angeles, April 29 to May 2, 1956.

From the Los Angeles County General Hospital, the Department of Surgery, College of Medical Evangelists, Los Angeles 33, and The Harriman Jones Clinic-Hospital, Long Beach 2.

the inguinal hernias and 5.5 per cent of the indirect inguinal hernias. Undoubtedly, as one's experience with this condition increases, he will recognize some hernias actually to be sliding and not merely large bowel adherent to the wall of the hernial sac.

Sliding indirect inguinal hernias occur almost exclusively in males. The authors found no reported case in a female. However, of the 52 cases studied at the Los Angeles County General Hospital one was in a woman 79 years of age.

Most of the patients operated upon are elderly. The average age at operation at the Los Angeles County General Hospital was 66 years. The youngest patient in the present series was 38 years and the oldest 89 years. The incidence of sliding hernias in patients over the age of 50 years was nine times the incidence in younger persons. Forty-two and one-half per cent of the patients were over 70 years of age.

The left side is involved much more frequently than the right. In Ryan's[6] series there were 4.5 times more sliding hernias on the left. In the Los Angeles County General Hospital series there were 34 on the left side and 18 on the right. In the previously mentioned personal series (M. R. G.) there were 11 on the left and two on the right. In Ryan's series there were eight bilateral sliding hernias. The authors have seen none. In the 52 cases at the Los Angeles County General Hospital there were ten in which there was an associated nonsliding inguinal hernia on the opposite side.

Such hernias usually are of long duration before operation. In the Los Angeles County General Hospital series the average duration before operation was 13.1 years.

Almost one-half (46.2 per cent) of the hernias in the present series were reducible. Ryan reported that in his series 97 per cent were reducible. In the private series (M. R. G.) the hernia was reducible in all but two of the 13 cases.

Symptoms and signs of intestinal obstruction are reported to be infrequent. However, 21.1 per cent of the patients in the Los Angeles County General Hospital series had some symptoms and signs of obstruction. They were operated upon in emergency, which is indicative of the emergency nature of a large number of the hernia repairs done at this hospital.

The diagnosis often is unsuspected before operation. A large hernia of long standing in an elderly patient should cause suspicion of a sliding hernia. The hernia frequently is difficult to reduce. If reduced, the internal ring almost invariably is found to be very large. Sometimes there is a history of a truss formerly being effective but no longer being effective. Roentgen examination with barium enema may reveal colon outside of the abdominal cavity. Although the colon shown by x-ray may be free within the sac of an inguinal hernia, it actually may be part of the wall of the sac. Whether the hernia is sliding or not should make no difference to an experienced surgeon. The diagnosis will be made at the operating table and he may proceed with the proper repair without difficulty.

TREATMENT

Accurate diagnosis of a sliding indirect inguinal hernia usually is not made until the sac is opened. For this reason it is important to open all indirect inguinal hernial sacs on the anterior surface so as to avoid opening into bowel which might be forming the posterior wall of a sliding hernia. If colon is found in the sac, it does not necessarily establish the diagnosis of a sliding hernia. The colon may be free within the sac. It may be adherent to the wall of the sac by adhesions or by actual fusion of the lateral leaf of its mesentery to the parietal peritoneum. Such fusion is the normal anatomical finding in those portions of the colon where a free mesentery is not present. The authors do not consider such hernias as true sliding inguinal hernias. However, when the posterior wall of the sac is definitely found to be composed of bowel, it is a true sliding hernia. An inexperienced surgeon is liable to attempt dissection of the colon from the sac. This is impossible, for the colon actually forms the wall of the sac. Such attempts are dangerous. The bowel may be entered or, more likely, the blood supply to it may be damaged.

Regardless of the type of repair the surgeon contemplates, his first maneuver must be to free the entire sac from the cord structures to well above the internal ring. This is usually done with relative ease.

There are many reports of reduction of the hernia entirely from the inguinal approach. Zimmerman and Laufman[10] described placing a purse-string suture about the neck of the sac extending as high on the anterior surface as possible and on the posterior side as close as is safe to the reflection of the peritoneum on the colon. As the purse-string is pulled together the bowel is turned upward and the sac is closed. The sac and bowel are reduced into the abdominal cavity. The transversalis fascia then is closed snugly about the cord to reconstruct the internal ring. Further repair can be done according to the surgeon's usual method. Zimmerman and Laufman reported 24 cases in which this method was used, with no known recurrences, although the length of time of follow-up was not stated. The patients reported by Sensenig and Nichols[7] were operated upon by an inguinal approach. They mentioned a "bottling" procedure which apparently at-

tempts to reperitonize the mesentery of the bowel as is accomplished in the intraabdominal approaches. In 53 cases they found seven recurrent hernias, a 13 per cent incidence of recurrence. Hagan and Rhoads[1] reported repairing 15 sliding inguinal hernias by the inguinal approach, and a recurrence rate of 55 per cent. Throughout the literature on this subject there are frequent references to the high recurrence rate by any method utilizing only the inguinal approach.

In Ryan's recent report of 313 cases of indirect sliding inguinal hernia the exact method of repair was not described. However, it was made clear that all of the repairs were done from the inguinal region only and were accomplished in much the same manner as described by Zimmerman and Laufman. Freeing of the peritoneal sac from the transversalis fascia well above the internal ring was emphasized, as was snug closure of the internal ring after reduction of the bowel. The exceptionally high incidence of sliding indirect inguinal hernia in Ryan's series (6.75 per cent of all indirect hernias) would lead one to believe that many indirect hernias in which colon is merely seen at the internal ring were being classified as sliding hernias. However, he described the colon as being an average distance of 2.9 inches below the level of the internal ring. The recurrence rate in that series was remarkable—four recurrences in the series of 313 cases, and only one of these definitely known to be a recurrent sliding hernia. In addition, he mentioned another 558 patients with sliding indirect inguinal hernias who had been operated upon subsequent to the reported series, with no known recurrences. He also reported 8,000 cases in which inguinal hernia was repaired and the patient observed for more than one year with only one recurrence of indirect hernia.

Koontz[2] in an historical review stated that Fiaschi in 1907 was the first to report opening the abdomen above the inguinal canal in order to reduce and fix a sliding hernia and that Robbins in 1909 reported it had been his practice for years to open the abdomen through a rectus incision if there was any difficulty in reducing a sliding hernia. LaRoque[3] in 1919 advocated a muscle-splitting incision above the internal ring for all inguinal hernias. In 1932[4] he described in detail the use of this procedure for sliding hernias. Moschcowitz,[5] and many other investigators have also described intraperitoneal approaches to hernias.

Williams[9] in 1947 presented an excellent description of the LaRoque type of repair of sliding indirect inguinal hernia. The authors were impressed by the method at that time and began using it at the Los Angeles County General Hospital, and since then have recommended its use to the resident staff. The greatest drawback seems to be in the ability to understand the rather complicated maneuvers of the procedure and to teach them to the residents.

The hernial sac should be completely freed from the cord to a level well above the internal ring. The incision in the aponeurosis of the external oblique then is extended upward 6 to 8 cm. above the internal ring. At a level approximately 4 cm. above the internal ring the external oblique and transversus abdominis muscles are split in the direction of their fibers exactly as in the McBurney incision. The peritoneum at this level is opened transversely. On the left side the proximal limb of the descending colon is seen entering the internal ring and the distal limb is seen emerging from the internal ring. By a process of traction on the bowel from above and pressure from below, the bowel is reduced completely into the peritoneal cavity. Even with this advantage of traction and pressure, it is sometimes a tedious procedure to reduce the bowel. It would seem to be very difficult to do this entirely from the inguinal approach.

On the right side the cecum is noted to be extending through the internal ring. The appendix and even the terminal ileum may form part of the sac. Reduction is accomplished in the same manner as is done on the left side. As the bowel is drawn upward into the peritoneal cavity it is also drawn outward through the McBurney-type incision. This maneuver obverts the colon and its mesentery so that the surgeon views the posterior surface of the bowel rather than its anterior surface. On the left it then is apparent that there is actually no lateral leaf of mesentery present in its usual position because it has been spread out by the sliding process. Rather it is noted that the free surfaces of the peritoneal sac represent the lateral leaf of the sigmoid mesentery and that this leaf can be reconstructed only by reapproximating the free peritoneal edges. It is advisable to trim the edges considerably, for by so doing the excess peritoneal sac is obliterated. The edges are approximated with a continuous suture of chromic catgut which is carried down to the base of the mesentery and then upward to the inferior margin of the transverse incision in the peritoneum. We now advocate that the base of the mesentery be anchored to the iliac fascia with one or more sutures. Williams did not describe this step. Fingers placed against the internal ring from the peritoneal side show that the sac has been completely eliminated. The bowel is returned to the peritoneal cavity and the McBurney-type incision closed. It is of major importance that the internal ring be closed snugly by approximating the transversalis fascia medial to the cord. Failure to carry out this step probably accounts for many recurrences. Repair of the floor of the inguinal canal can be done according to the surgeon's dictates.

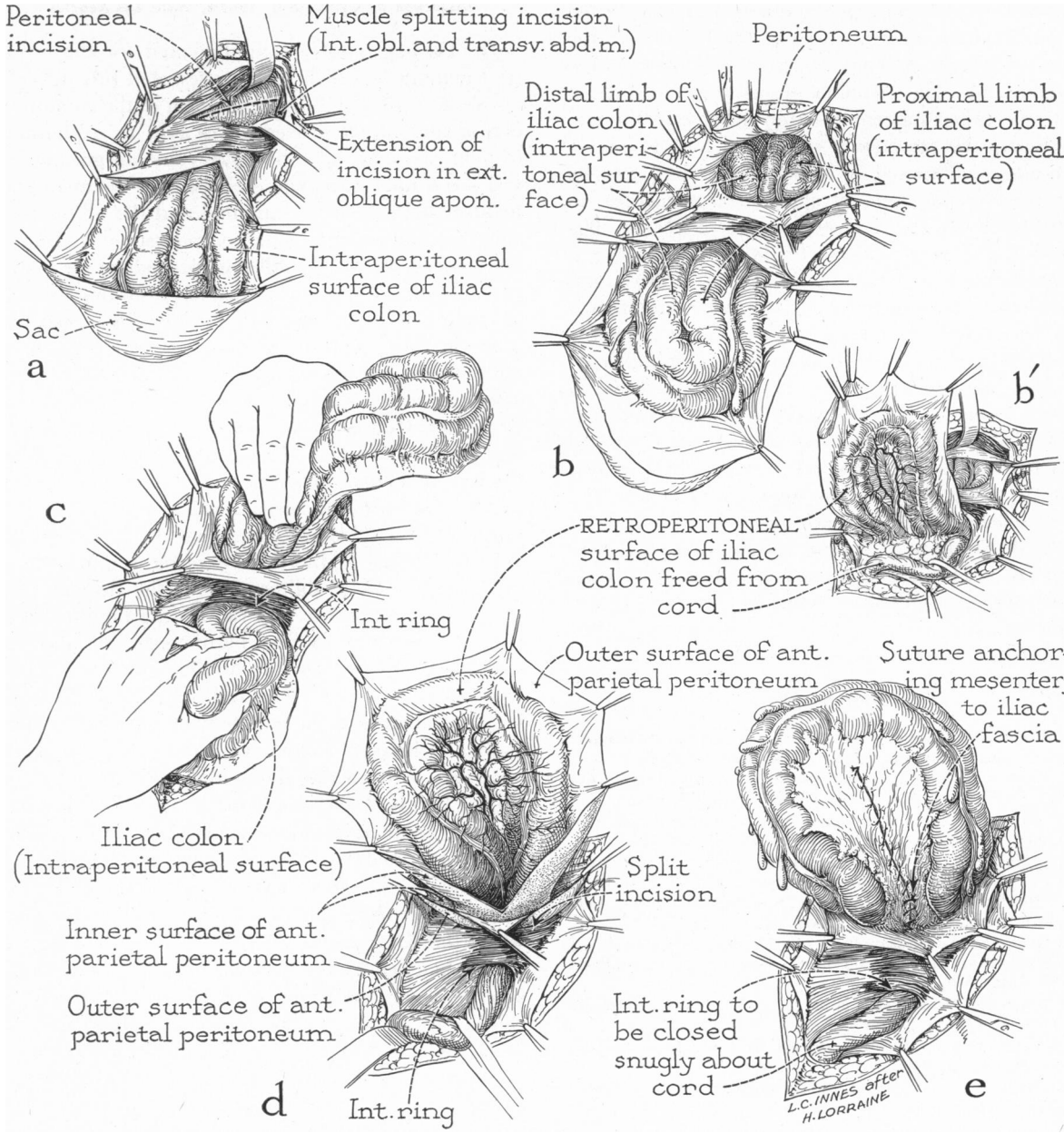

Figure 1.—Principles of the LaRoque maneuver for repair of sliding indirect inguinal hernia. See text for details.

COMMENT

As was stated earlier, the authors have found this a difficult procedure to teach to residents, particularly in view of the fact that at Los Angeles County General Hospital many of the residents assigned to general surgery are from specialized services such as urology, gynecology, orthopedics and neurosurgery. Some of them have attempted the LaRoque procedure when confronted with a sliding indirect inguinal hernia. It was obvious from the operative reports that they were not entirely familiar with its technical details. There were recurrences in seven of the 52 cases repaired by the LaRoque method, most of them within a few months of operation, which tends to indicate faulty operative technique. Of the 13 patients with repair of sliding indirect hernia done by one of the authors (M. R. G.) in the previously mentioned personal series, there were no recurrences and most of the patients had been observed for more than two years after operation.

In spite of the rather high incidence of recurrence in the Los Angeles County General Hospital series, the authors are not inclined to abandon the LaRoque procedure, feeling that it is a much more logical

approach to the problem of sliding indirect inguinal hernia than the mere stuffing of the bowel into the peritoneal cavity and subsequent snug closure of the internal ring. The "stuffing procedure" violates the first rule of hernia repair—high ligation of the sac. Obviously the sac cannot be ligated high if one of its walls is composed of bowel. The bowel must be reconverted into an intraperitoneal structure in order to eliminate the posterior wall of the sac. The anterior wall is eliminated by resecting most of it and suturing the remainder so as to convert it into a mesenteric structure. Exposure of the pathological process is more complete when viewed from the peritoneal cavity. Opening the lower peritoneal cavity presents no added operative hazard, even in elderly patients. If the operative hazard were excessive, we would prefer excision of the cord and testicle with complete closure of the ring after reduction of the hernia from the inguinal approach. The authors believe that the LaRoque procedure has not received the attention it deserves and that when it is properly taught and properly performed it is an ideal method of dealing with these rather severe problems.

211 Cherry Avenue, Long Beach 2.

REFERENCES

1. Hagan, W. H., and Rhoads, J. E.: Inguinal and femoral hernias, Surg., Gyn. and Obst., 96:226, Feb. 1953.
2. Koontz, A. R.: The operation for difficult sliding hernia of the large bowel, Am. Surg., 18:78, Jan. 1952.
3. LaRoque, G. P.: Permanent cure of inguinal and femoral hernia, Surg., Gyn. and Obst., 29:507, Nov. 1919.
4. LaRoque, G. P.: Intra-abdominal method of removing inguinal and femoral hernia, Arch. Surg., 24:189, Feb. 1932.
5. Moschcowitz, A. V.: Rational treatment of sliding hernia, Ann. Surg., 81:330, Jan. 1925.
6. Ryan, E. A.: An analysis of 313 consecutive cases of indirect sliding inguinal hernias, Surg., Gyn. and Obst., 102:45, Jan. 1956.
7. Sensenig, D. M., and Nichols, J. B.: Sliding hernias, Arch. Surg., 71:756, Nov. 1955.
8. Watson, L. F.: Sliding hernia, Internal Clin., 4:155, Dec. 1925.
9. Williams, C.: Repair of sliding inguinal hernia through abdominal (LaRoque) approach, Ann. Surg., 125:612, Oct. 1947.
10. Zimmerman, L. M., and Laufman, H.: Sliding hernia, Surg., Gyn. and Obst., 75:76, July 1942.

***Discussion* by GORDON K. SMITH, *M.D.*, Los Angeles**

Dr. Gaspar is to be complimented for the beautiful manner in which he has presented this difficult problem. Explaining the mechanism of the combined inguinoabdominal procedure is akin to explaining to your six year old son where your lap goes when you stand up. Unless you can visualize the anatomic features both from the inguinal and the abdominal side it is almost impossible to understand it. I have been interested in the LaRoque procedure for many years. In addition to its application to sliding hernia, as suggested by Dr. Gaspar, we have increased the scope of this procedure and are also applying it to other forms of inguinal hernia. A recent five-year study of patients admitted to the Hospital of the Good Samaritan, Los Angeles, for repair of recurrent inguinal hernia showed that 61 per cent of these patients had recurrent *indirect* inguinal hernia and 8.7 per cent of these recurrences were sliding inguinal hernia. This suggested that the initial procedure had failed to fulfill the cardinal requirements, viz., the complete obliteration of the hernial sac. Therefore, we now use it in (a) sliding inguinal hernia, (b) recurrent indirect hernia with thin and friable sacs, (c) irreducible hernia with or without strangulation of bowel or omentum, and (d) femoral hernia. Categorical statements have been made such as that by Ryan of Canada who states that it is *never* necessary to open the abdominal cavity to repair a sliding hernia. I am sure that I can handle this complicated anatomical derangement best with a combined inguinoabdominal approach, and therefore I will leave to the other surgeons their "stuffing" procedure from the inguinal side alone. The ease with which the above mentioned forms of inguinal hernia can be handled by the combined incision is remarkable, and as one gains experience with the procedure it decreases the total operating time. I firmly believe that anything that makes a procedure easy for the surgeon reflects itself in a smooth postoperative course. Ryan reports one recurrence in 8,000 operations for indirect inguinal hernia. This statement indicates naivete or insufficent follow-up.